

**Araujo MG, Wennstrom JL, Lindhe J. Modeling of the buccal and lingual bone walls of the fresh extraction sites following implant installation Clin. Oral Implan. Res. 17 2006; 606-614.**

**Purpose:** The purpose of this study was to determine whether modeling of the alveolar ridge that occurs following tooth extraction and implant placement, and if this modeling was influenced by the size of the hard tissue walls of the socket, and if it will continue after the first 4 weeks of healing.

**Materials and Methods:** Six beagle dogs were part of this study, using the third premolar and first molar in both quadrants of the mandible. Mucoperiosteal flaps were elevated and the distal roots were removed. Implants were installed in the fresh extraction socket in one side of the mandible. The flaps were replaced to allow a semi-submerged healing. The procedure was repeated in the contra lateral side of the mandible after 2 months. The animals were sacrificed 1 month after the final implant installation. The mandibles were dissected, and each implant site was removed and processed for histologic examination.

**Findings:** The mean buccal- lingual width of the entrance of the extraction socket of the premolar sites was 3.8mm, at the molar site was 5.8mm. Marked hard tissue alterations occurred during healing following tooth extraction and implant installation in the socket. The marginal gap that was present between the implant and the walls of the socket at implantation disappeared as a result of bone fill and resorption of the bone crest. The modeling in the marginal defect region was accompanied by marked attenuation of the dimensions of both the delicate buccal and the wider lingual bone wall. The mucosa at the implant sites was protected with a wide, well-keratinized oral epithelium that was continuous with a thin barrier epithelium that faced the implant surface. The dense connective tissue that resided between the two epithelial compartments was devoid of infiltrates of inflammatory cells. Bone loss at molar sites was more pronounced than at the premolar locations.

**Conclusions:** Implant placement failed to preserve the hard tissue dimension of the ridge following tooth extraction. The buccal as well as the lingual bone walls were resorbed. At the buccal aspect, this resulted in some marginal loss of osseointegration.

*Araujo MG, Lindhe J. Dimensional ridge alterations following tooth extraction. An experimental study in the dog. J Clin Periodontol 2005;32:212-18.*

**Purpose:** To study the dimensional alterations of the alveolar ridge that occur after tooth extraction as well as processes of bone modeling and remodeling in the dog model.

**Materials and Methods:** Twelve mongrel dogs were used in this study and were fed a soft-pellet diet. Intracrevicular incisions were made around the third and fourth premolars of both mandibular quadrants. Small full thickness flaps were raised to expose the marginal alveolar bone. Premolars were hemisected with the distal root being extracted. Root canal therapy was completed on the mesial root. The extraction sites were covered with gingival tissue and sutured. The dogs teeth were cleaned 3X per week. Dogs were sacrificed with extraction intervals of 1, 2, 4, and 8 weeks. Mandibles were removed and prepared for histologic and histometric examination. To determine the height of the bone walls, a line parallel to the long axis of the root was drawn in the center of the socket to divide the buccal and lingual compartments. Horizontal lines were drawn perpendicular to this dividing line at the coronal most portion of the buccal and lingual plates. The width of both compartments were measured at 3 locations, 1, 3, and 5mm apical of the bone crest.

**Findings:** At 1 wk of healing, signs of inflammation were noted. The marginal portion of the lingual wall was markedly wider than the corresponding buccal wall. The internal portion of the was occupied with coagulum, granulation tissue, provisional matrix, and small amounts of newly formed bone. At 2 weeks of healing, large amounts of newly formed bone was found apical and lateral portions of the socket. At the 4 week mark, high numbers of osteoclasts were found on the outer surface of both the buccal and lingual bone walls apical of the crestal regions. At 8 weeks, the lingual bone height was considerable wider than the buccal wall. The crest of buccal bone was approximately 2mm apical the lingual crest. The internal portion of the socket was comprised of bone marrow with few trabeculae of mineralized tissue.

**Conclusions:** The author's conclude that resorption of the buccal and lingual walls following extraction occurs in 2 phases. During Phase I, the bundle bone that lost its function was resorbed and replaced with woven bone. Because the buccal bone was comprised solely of woven bone, this resulted in substantial vertical bone loss of the buccal crest. Phase 2 included resorption that occurred from the outer surfaces of both bone walls, which is not currently understood. Author's postulate that the loss of vascularity of raising a flap could account for the bone loss in phase 2.

**Cetinkaya B, Keles G, Ayas B, et al. Comparison of the proliferative activity in gingival epithelium after surgical treatments of intrabony defects with bioactive glass and bioabsorbable membrane. *Clin Oral Invest* 2007;11:61-68.**

**Purpose:** To compare the proliferative activity of gingival epithelium using proliferating cell nuclear antigen (PCNA) as a marker of cell proliferation after surgical treatments with bioactive glass graft material and bioabsorbable membrane.

**Materials and Methods:** Ten systemically healthy patients with a mean age  $42.70 \pm 2.16$  years (range 33 to 55 years) exhibiting radiographic evidence of bone loss were recruited for the study. The criteria needed for inclusion consisted of patients having similar paired vertical interproximal osseous defects. Using split mouth design, 20 intrabony defects were randomly assigned treatments with bioactive glass (BG group) or bioabsorbable membrane (BM group). Probing pocket depth (PPD), clinical attachment level (CAL), plaque index (PI) [36], and gingival index (GI) [22] were assessed immediately before surgery and at 12 weeks after surgery by force-controlled Florida Probe. Gingival biopsies were taken at preoperative and postoperative 12 weeks. After histological processing, the number of the inflammatory cells was measured in hematoxylin and eosin-stained sections; PCNA expression was determined in immuno-histochemically-stained sections.

**Findings:** There were no differences intergroup preoperatively in clinical parameters. Treatment improved clinical parameters in both groups with no difference between 2 groups post operatively. Preoperatively no difference was found between two groups in terms of inflammatory cells. At postoperative 12 weeks, the number of the inflammatory cells was significantly decreased ( $p < 0.01$ ) in both groups. PCNA expression was significantly increased ( $p < 0.001$ ) in both treatment groups compared to baseline data. There was no significant difference in PCNA expression between baseline values of two groups ( $p > 0.05$ ), while at postoperative 12 weeks, increase in BG group was significantly greater than that in BM group ( $p < 0.001$ ).

**Conclusions:** These results suggest that epithelial cell proliferation is more prominent after treatment of intrabony defects with bioactive glass compared to the treatment with bio-absorbable membrane. The results can also be extrapolated to suggest that determination of the epithelial proliferative activity with certain nuclear antigens can be used as an indicator to evaluate the type of healing after periodontal surgical treatments.

***Grant BT, Amenedo C, Freeman K, Kraut RA. Outcomes of placing dental implants in patients taking oral bisphosphonates: a review of 115 cases. J Oral Maxillofac Surg 2008; 66:223-30.***

**Purpose:** The purpose of this paper was report on the incidence to which bisphosphonate-associated necrosis of the jaw (ONJ) has occurred among dental implant patients at Montefiore Medical Center between January 1998 and December 2006. The authors also wanted to determine whether there was an indication that bisphosphonate therapy (BT) had affected overall success of implants from 1998 to the present.

**Material and Methods:** 1,319 female patients over the age of 40 that received implants at the aforementioned medical center between January 1998 and December 2006 were each mailed a survey regarding the potential risk of BT and their implants. 458 patients responded to the questionnaire of which 115 reported taking BT at the time of implant placement. None of the 1,319 patients reported taking IV BT. Each of the 115 patients were contacted. 72 of them returned to the clinic for clinical and radiographic evaluations of 468 total implants.

**Findings:** No incidence of ONJ were discovered upon evaluation of the 72 patients with 468 total implants. Furthermore, only 2 of the 468 implants placed in these individuals failed. 89 of the 115 patients reporting BT started before implant placement; 33 of which reported taking BT more than 3 years prior to surgery. Among patients not taking BT 1,450 implants were placed and 1,436 were successful.

**Conclusion:** Oral BT did not appear to significantly affect implant success when compared to the success rate of implants placed in patients not taking BT. Furthermore surgery on patients receiving BT did not result in bisphosphonate-associated ONJ.

*Juodzbaly G, Sakavicius D, Wang H-L. Classification of extraction sockets based upon soft and hard tissue components. J Periodontol 2008; 79: 413-24.*

**Purpose:** To propose a new classification system for the maxillary anterior extraction socket based upon soft and hard tissue parameter.

**Materials and Methods:** Twenty-five subjects with a total of 25 teeth were recruited in the study. After atraumatic tooth extraction, the extraction sockets were evaluated using the proposed parameters. The Soft tissue assessments include: 1) Soft tissue contour variation (the distance between the socket MGJ and those of the adjacent teeth); 2) Vertical soft tissue deficiency (distance between the socket buccal mucosa tissue margin and those of the adjacent teeth); 3) The keratinized gingival width on the mid buccal side; 4) The mesial and distal papillae appearance using the classification by Nordland and Tarnow; 5) Gingival tissue biotype by gingival thickness; 6) Soft tissue quality. The hard tissue assessments include: 1) The height of the alveolar process (distance between the socket margin to the nasal sinus floor); 2) Available bone beyond the apex of the extraction socket to achieve implant primary stability. 3) extraction socket labial plate vertical position (distance between the margin of the extraction socket labial plate and the CEJ of the adjacent teeth); 4) extraction socket facial bone thickness; 5) Presence of extraction socket bone lesions; 6) intradental bone peak height; 7) The mesiodistal distance between adjacent teeth; 8) palatal angulation (angle between the extraction socket and neighboring teeth). Based on the criteria listed above, the extraction sockets were classified as type I when all parameters fulfill the adequate category. Type II classification was made if at least one parameter was compromised. If some parameter was graded as deficient, the socket will be classified as Type III. Type I socket was received immediate implant, while type II sockets will receive either immediate or delayed implantation. Type III sockets will receive staged implantation after soft and hard tissue augmentation or other treatment. The parameters were decided by two surgeons during the surgery and based on the classification, the socket will receive the treatment recommended. The esthetic result and soft tissue evaluation was done by one surgeon at the time of prosthesis placement.

**Findings:** The interobserver agreement was 96% for the soft tissue assessment and 92% for the hard tissue. The overall interobserver agreement was 96%. At the time of prosthesis placement, the esthetic soft tissue assessment revealed no deficient soft tissue was identified and 80% of the sockets were graded as type I.

**Conclusions:** The previous classification proposed by Caplanis et al fell short in distinguishing several assessments such as keratinized width, soft tissue quality, implant angulation, etc. The goal for this new classification is to overcome some of the deficiencies noted in the previously published classification systems, especially in the esthetic zone.

*Juodzbaly G, Bojarskas S, Kubilius R, et al. Using the support immersion endoscopy for socket assessment. J Periodontol 2008; 79(1): 64-71. (33 ref.)*

**Background:** Success or failure of an immediate implant in the maxillary anterior is dictated by two factors: 1) optimal esthetics and 2) osseointegration. Implant success is ensured by proper placement of the implant and sufficient amounts of bone to facilitate successful osseointegration. However, the current technique used to assess an extraction socket prior to immediate implant placement does not overcome a major challenge, namely, the use of a flap for direct visualization. The investigators introduce a different technique to assess the morphology of an extraction socket. The benefit of this technique is that flaps are not raised to visualize the socket.

**Purpose:** To determine the indications and to identify the efficacy and advantages of the Socket Immersion Endoscopy (SIE) for extraction socket evaluation, specifically in the anterior maxillary region.

**Materials and Methods:** Twelve systemically healthy adult human subjects (eight men, four women) participated in this examination to compare the effectiveness of using the Conventional Extraction Socket Evaluation technique *versus* the Socket Immersion Endoscopy (SIE) in assessing extraction socket bone volume and surrounding soft tissue status. All subjects required extraction of a single tooth in the maxillary anterior region (in all, 8 central incisors and 6 lateral incisors). Subjects were free of any traumatic or inflammatory soft and hard tissue and did not require any restorative treatment. Teeth planned for extractions were atraumatically extracted to preserve the socket walls. Subsequently, all extraction sockets were visualized by using the Conventional Extraction Socket Evaluation (CESE) or the SIE. Specifically, the soft tissue, socket morphology, and the amount of intact bone were assessed.

**Findings:** Both CESE and SIE were effective in evaluating the soft and hard tissue, however statistically significant differences were noted in the measurements of the following parameters: socket labial plate vertical thickness and the labial plate thickness. Using CESE alone (a dental mirror and a probe), the mean vertical thickness was measured as 4.45 mm while the mean labial plate thickness was 2.37 mm. In comparison, using the SIE technique, the mean vertical thickness was measured as 3.64 mm and the mean labial plate thickness was 2.14 mm. Statistical analysis (Wilcoxon signed-rank test) revealed that measurements obtained from the *SIE technique were more accurate than the CESE technique*. In addition, the presence of pathologic lesions in the extraction sockets could only be detected by the SIE technique.

**Conclusions:** Measurements obtained by using endoscopy were more accurate than using conventional methods to assess the extraction socket. Specifically, the study shows that the SIE was more accurate in measuring the *labial plate vertical thickness, the labial plate thickness, and the detection of pathologic lesions in the extraction socket*. This increase in accuracy may be attributed to *the increased visibility* in the extraction socket which allows for proper placement of the periodontal probe (for measurement) and for optimal detection of pathologic lesions in the extraction socket. The investigators are

keen to admit that the surgical endoscope has limitations in clinical dentistry (i.e. costs, space requirements, large learning curve, and time required to assess the extraction socket with the endoscope and the CESE technique.) However, the endoscope may be a helpful adjunct in evaluating the socket immediately following extraction and in the diagnosis and treatment planning of an immediate implant, especially in the maxillary anterior.

DropBooks

*Nevins M, Carmelo M, De Paoli S, et al. A study of the fate of the buccal wall of extraction sockets of teeth with prominent roots. Int J Perio Rest Dent 2006; 26: 19-29*

**Purpose:** To determine the fate of thin buccal bone encasing the prominent roots of maxillary anterior teeth following extraction.

**Materials and Methods:** The study subjects were three male and six female patients who had a minimum of two periodontally compromised prominent maxillary anterior teeth that were candidates for extraction. For these teeth, the buccal plate had to be compromised but had to be intact enough to support bone formation in the extraction socket. Nineteen extraction sockets were allocated to the test group and were grafted with Bio-Oss, while 17 control sites were allowed to heal spontaneously. Each subject had a CT scan immediately after extraction and after 30 to 90 days. Based on the CT scans taken immediately after extraction, implants were placed at the discretion of the surgeon. During implant placement a total of 10 biopsies (five control and five test) were taken to be analyzed histologically. For each CT scan the change in alveolar crest height was evaluated.

**Findings:** There was no significant difference between the control and test groups regarding the height of the crest at baseline. At the time of entry surgery the control sockets lost more height than the test sockets. The control group lost  $5.24 \pm 3.72\text{mm}$  while the test group lost  $2.42 \pm 2.58\text{mm}$ . This difference between the groups was statistically significant. In 16 of the 19 test sites treated with Bio-Oss, the crest height was maintained or showed a loss of less than 20%. Only 5 of 17 control sockets remained stable, while 12 showed a loss of more than 20%. The histological study of the biopsy samples revealed that Bio-Oss granules could be identified in the test group sockets.

**Conclusions:** Loss of crestal bone height following extraction of maxillary anterior teeth is significantly reduced by treating the extraction site with Bio-Oss. There was a statistically significant difference in crestal bone height between the control and test group. Filling a fresh extraction socket with Bio-Oss increased the probability that the original crest height and form could be maintained and allowed for more optimal bone and soft tissue conditions for implant placement. Some of the untreated extraction sites healed correctly but these cases could not be identified before extraction. Thus, it is prudent to introduce osteoconductive substances into the extraction sockets of teeth with prominent roots in order to prevent the loss of the buccal plate and the compromise of implant placement.



***Ozcelik et.al. Improved wound healing by low level laser irradiation after gingivectomy operations: a controlled clinical pilot study. J clin Periodontol 2008; 35: 250-254.***

**Purpose:** To assess the effects if LLLT on wound healing of the gingival after gingivectomy and gingivoplasty procedures.

**Materials and Methods:** Twenty subjects with symmetrically over contoured gingivas were recruited to the study. Pt had to have at least six affected teeth to be included in the study. Gingivectomy and gingivoplasty were performed on both sites. After the operations one site was randomly selected to received LLLT. The LLT used in this study was a diode laser, with a wave length of 588nm, and an output power of 120mV. Sites were irradiated for 5 minutes immediately following the procedure and everyday for 7 days following the surgery. The control sites were treated with the laser tip, but the laser remained off. No dressing was used after surgery and pt were placed on naproxen sodium for pain. After the LLLT plaque disclosing solution was placed on the epithelium to better visualize areas where gingival epithelium was absent. Digital images of the stained gingiva were obtained right after the surgery and at all post op visits. The examiner traced and measured the total area of stained epithelium with the help of an image analyzing software. The dark stained sites were considered still undergoing wound healing. Staining was measured on the 3<sup>rd</sup>, 7<sup>th</sup> and 15<sup>th</sup> days after surgery.

**Findings:** All pt's completed the study without any post-op complications. The LLLT group had statistically significant lesser amount of wound staining, than the control on days 3,7, and 15. There was no statistically significant difference immediately after. Complete wound healing was seen between 18 and 21 days in the experimental group, and between 19 and 24 day in the control group.

**Conclusion:** LLLT may improve wound healing after a gingivectomy by increasing the rate of surface epithelization. However, further investigation is needed to improve and gain more benefit form this technique.

**Retzepi M, Tonetti M, Donos N. Comparison of gingival blood flow during healing of simplified papilla preservation and modified Widman flap surgery: a clinical trial using laser Doppler flowmetry. J Clin Periodontol 2007 Oct; 34 (10); 903-11.**

**Purpose:** To compare the microvascular gingival blood flow changes of the alveolar mucosa and the buccal and palatal inter-dental papillae, during the post-operative healing period, following simplified papilla preservation flap (SPPF) versus modified Widman flap (MWF) in patients with chronic periodontitis, using laser Doppler flowmetry (LDF).

**Materials and Methods:** Randomized-controlled single-blinded split-mouth clinical trial with a 2 month follow-up. Ten patients (6 male, 4 female) were included in the study. Twenty contra-lateral upper sites with pocket depth  $\geq 5$  mm after initial treatment in 10 chronic periodontitis patients were randomly assigned to either test or control treatment, using a split-mouth design. LDF recordings were performed pre-operatively, following anesthesia, immediately post-operatively and on days 1, 2, 3, 4, 7, 15, 30, and 60, at nine selected sites per flap.

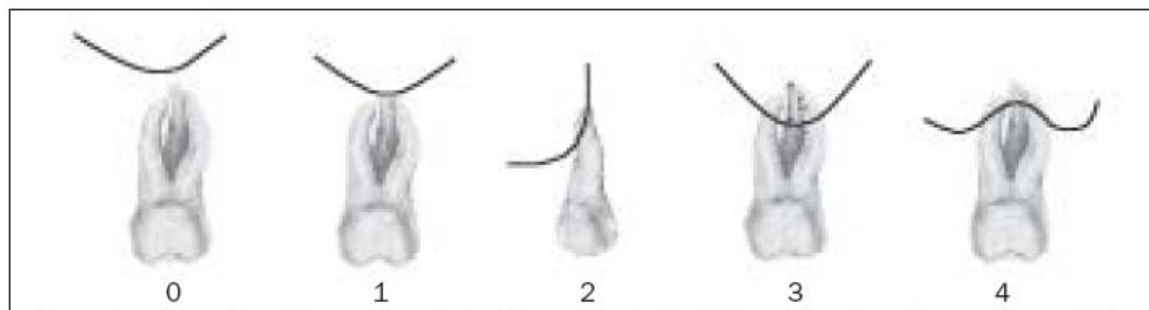
**Findings:** The results indicated that the flap design was associated temporal variations in the microvascular blood flow responses, which were observed among the treatment groups during the wound-healing period. It was shown that significant ischaemia occurred at all sites following anesthesia and immediately post-operatively. At the mucosal flap basis, a peak hyperaemic response was observed on day 1, which tended to resolve by day 4 at the test sites, but persisted until day 7 at the control sites. The buccal and palatal papillae blood perfusion presented the maximum increase on day 7 in both groups and returned to baseline by day 15. Both surgical modalities yielded significant pocket depth reduction, recession increase and clinical attachment gain.

**Conclusion:** The results of the present study confirm those of the authors' previous studies, in that the gingival blood flow presents specific patterns of dynamic changes post-operatively and that LDF may present clinical applicability in recordings changes in the microcirculatory blood perfusion following periodontal surgery. Furthermore, the results indicate that the location of the incisions and the management of the SPPF, aiming at preserving the papillary aspects, may have a positive effect on the recovery of the gingival blood flow post-operatively.

*Sharan A, Madjar D. Maxillary sinus pneumatization following extractions: A radiographic study. Int J Oral Maxillofac Implants 2008;23:48-56.*

**Purpose:** To identify and measure postextraction maxillary sinus pneumatization using fixed reference lines on panoramic radiographs.

**Materials and Methods:** The panoramic radiographs included in this study were all obtained with the same machine and all the radiographs showed the roots of the posterior maxillary teeth, the maxillary sinus floor, the zygomatic processes and the inferior orbital margins. Three reference lines were marked, namely an interorbital line joining the most inferior points of both orbital margins and 2 zygomatic process lines parallel to the interorbital line. Measurement in this study included the distance between the interorbital line and the zygomatic process line and the distance between the interorbital line and the maxillary sinus floor superior to either the second premolar, first molar or second molar. Each measurement was done 3 times and the mean of the three measurements was used for statistical analysis. The first part evaluated sinus expansion via the comparison of dentate and contralateral edentulous sites. 152 panoramic (135 males & 17 females) were selected. Each subject was missing at least 1 posterior maxillary tooth on 1 side and fully dentate in the contralateral side. The vertical distance between the interorbital line and the inferior cortical border of the maxillary sinus (IS) in the area of missing tooth and the contralateral existing tooth were measured. The lengths of the vertical distances between the interorbital line and the zygomatic process lines (IZ) on both sides were also measured. Using the distance IS as a numerator and the distance IZ as a denominator. The ratio compensated the distortion caused by head tilting. A formula:  $IS_x - (IS_t * IZ_x / IZ_t)$  was used to calculate the superoinferior differences of the sinus floor position between two sides (x-missing tooth, t- tooth retained). Another group of 64 radiographs with all posterior teeth on both side served as a control. The second part evaluated sinus expansion by comparison of the same sited before and after extraction. Fifty-eight pairs of panoramic radiographs were measured before the extraction and 72 post-extraction panoramic radiographs were measured with a follow-up time of 6-67 months. In the first radiograph, the tooth was classified (Class 0-4, Fig. 2) according to the topographic relationship between its root and the sinus floor. The lengths of the vertical distances IS and IZ and aforementioned calculation were performed to find the superoinferior differences in the position of the sinus floor between the postextraction and the pre-extraction radiographs. A group of 41 pairs of panoramic radiographs with all posterior



teeth on both side served as a control group.

**Findings:** No significant differences were found in the control group between the right and left side of fully dentate subject. No different was found between male and female either. For the first part of the study, the experimental group showed a more inferiorly located sinus floor on the side of the missing posterior tooth (mean difference 2.18 mm). A 1-way ANOVA indicated significant difference in the extent of inferior sinus expansion among missing tooth types. The largest expansion was found on the second molar missing. For the second part of the study, the experimental group showed a more inferiorly located sinus floor on the postextraction radiograph (mean difference: 1.83mm) and was statistically significant when comparing with the control group. A considerable expansion was noted when the extracted tooth was of classification 4, which was significantly different from all other classifications. No significant correlation was found between the amount of sinus expansion and the root projection length to the sinus cavity before extraction. No significant correlation was found between the sinus expansion and the period between the pre-extraction and postextraction radiographs. In cases where 2 or more adjacent teeth were extracted in the same site, it showed a significant larger sinus expansion when compared to only 1 tooth was extracted. For teeth that were classified as class 3 or 4 before the extraction, about 94% of the sinus floor after the socket healing appeared flat or inferiorly curved

**Conclusions:** Previous clinical studies indicated that the closest proximity between the sinus floor and the teeth is found in the second molar area. Extraction may cause a frequent loss of the thin bone and this study may further support this concept. When extracting a maxillary posterior tooth, one should be aware of the increased probability for sinus pneumatization in the following cases: 1. Teeth surrounded by a superiorly curving sinus floor; 2. Tooth roots shown to protruded into the sinus cavity by CT imaging; 3. Extraction of second molars; and 4. Extractions of several adjacent posterior teeth or extraction of a tooth with missing adjacent teeth. In order to prevent the sinus pneumatization and preserve the bone height, one should consider immediate implantation and/or immediate bone grafting at the time of extraction.

**Wang HL, Weber D, McCauley LK. Effect of long-term oral bisphosphonates on implant wound healing: literature review and a case report. J Periodontol. 2007;78:584-94.**

**Purpose:** The purpose of this article is to review the literature associated with bisphosphonate use that could impact bone healing and to report a case of bone necrosis in a patient on long-term oral bisphosphonates.

**Materials & Methods:** Literature review from 1960-2006, case report, and author's opinion were the basis for the article.

**Findings:** The two main categories of bisphosphonates are non-nitrogen and nitrogen containing drugs. Both forms of the drug are taken up into mineralized structures and released during resorption and internalized by osteoclasts. The non-nitrogen bisphosphonates are metabolized by osteoclasts into analogues that build up and lead to osteoclast apoptosis. Nitrogen containing bisphosphonates are taken up by osteoclasts during resorption and disrupt the mevalonate pathway. Inhibition of this pathway does one of 2 things: 1) it effects intracellular pathways which intern effect osteoclasts ability to form a ruffled border which is essential for bone resorption; 2) it produces similar effects as non-nitrogen bisphosphonates resulting in cell death. In general terms non-nitrogen containing bisphosphonates were first generation drugs. They were less potent and large doses were required to achieve desired resorption over a lengthy period of time. As a result these drugs have been associated with renal failure. The development of nitrogen containing bisphosphonates allowed for the delivery of a nearly 10-100 fold increase in potency while significantly lowering dosages of the drug. Bisphosphonates can be delivered orally or through IV infusion. While there have been reports of osteonecrosis of the mandible and maxilla (ONJ) associated with oral bisphosphonates, the overwhelming evidence of ONJ has been associated with IV use. The case report is of a 65 year old women taking Alendronate (Fosamax) for the past 10 years. 6 weeks after 5 implants were placed bilaterally in the mandible the patient presented with apical radiolucency and fluctuant swelling on the lower left. Surgery revealed large bony defects that were degranulated, detoxified with tetracycline filled with FDBA and a resorbable membrane. While the patient presented with subsequent necrotic sequestra, the implants healed uneventfully at 6 months and were ready for healing.

**Conclusion:** Invasive dental procedures should be avoided in patients who have a history of IV bisphosphonates as stated by the AAP. However practitioners should be aware of the potential risk of long-term oral usage of bisphosphonate usage in some patients. Future studies are needed.